

Happy Coexistence

Embedding nature in the
renewable energy shift

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Co-funded by the European Union.

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

1. INTRODUCTION

This briefing aims to shed light on the current intersection of renewable energy deployment and biodiversity protection within the EU's renewable energy transition. While the EU must accelerate the deployment of renewables to deliver its climate objectives, this process needs to also uphold the highest environmental standards, and maximise synergies between renewable energy and biodiversity protection.

It presents successful case studies where renewable initiatives have been planned or implemented in harmony with nature in selected European countries. Building on these examples and CAN Europe's existing work on renewable energy, the briefing concludes with targeted recommendations and forward-looking insights to support NGOs and policymakers in advancing a sustainable energy future in synergy with nature protection.

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The ongoing climate crisis requires a rapid and sustained deployment of renewable energy at the core of the EU's transition, primarily from wind and solar sources. The [revised Renewable Energy Directive \(RED III\)](#) sets a binding target of at least 42,5% share of renewables in the overall EU's energy consumption mix, with an aspirational target of 45%. In 2024, [renewable energy sources accounted for 47.5% of gross electricity consumption in the EU](#) - with wind and solar among the main sources with a respective share of 38.0% and 23.4%.

At the same time, in response to the twin climate and biodiversity crises, and in light of the European Green Deal, the EU Commission has launched the [EU Biodiversity Strategy 2030](#) in which it has committed to protect nature. Derived from this strategy, the EU has committed to biodiversity-related international agreements under the [Kunming-Montreal Global Biodiversity Framework](#) and also adopted the groundbreaking [Nature Restoration Law](#) (NRL), which includes an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas.

Accelerating renewable deployment is crucial to tackling climate change, and it must go hand in hand with protecting biodiversity and supporting the wellbeing of local host communities. Biodiversity can be affected not only by the direct impacts of climate change, such as altered habitats and shifts in species distribution, but also by certain [climate change mitigation measures](#) if potential synergies with biodiversity conservation are not fully considered. Achieving a fast and nature-positive energy transition requires careful planning and governance. Spatial planning (including early sensitivity mapping, strategic environmental assessment, and with strong public participation) is crucial to identify the suitable areas to deploy new renewables projects, and their related grids and infrastructure. CAN Europe, together with the Öko-Institut, BirdLife Europe and Central Asia, EEB, The Nature Conservancy and WWF EPO, have elaborated [actionable recommendations](#) at EU and national levels built upon the implementation analysis of spatial planning and the designation of Renewables Acceleration Areas (RAAs) in selected EU countries - helping shape policies that balance climate urgency with ecological integrity.

This briefing presents concrete European examples where renewable energy projects have been developed in hand with nature protection, drawing lessons for policymakers and civil society on how to enable a fast, fair, and nature-positive energy transition.

2. HAND IN HAND WITH PROTECTING NATURE: EXEMPLARY PROJECTS BASED ON TECHNOLOGIES

2.1 Wind

2.1.1 Offshore wind and the Avoidance and Minimisation of Environmental Impacts

The rapid development of offshore wind energy highlights the challenge of tackling the climate crisis without inadvertently harming biodiversity. As marine space becomes increasingly crowded with human activities, identifying and operationalising synergies between offshore renewables and ecosystem protection is essential.

At EU level, the OCEaN coalition contributes to this effort by bringing together NGOs¹, TSOs and wind industry actors from the North, Baltic and Mediterranean Seas - compiling and promoting best-practices examples in which careful and responsible planning of offshore wind farms and their associated grids are capable of limiting impact on nature.

There is a growing number of [natural enhancement and restoration projects](#) showcasing the harmony between offshore renewable energy expansion and marine ecosystem restoration. For instance, in the Bay of Pollença (Mediterranean Sea - Spain), there is a [project](#) launched to compensate for impacts from submarine cables by restoring degraded meadows of *Posidonia oceanica*, species particularly important for carbon sequestration, habitat provision, sediment stabilisation, and coastline protection. Therefore, this restoration not only mitigates environmental damage from the cables, but actively contributes to ecosystem recovery and resilience. The project was a successful case that is planned to scale-up.

Effective avoidance and minimisation measures are essential to advance these solutions, especially in marine space. Avoidance measures focus on selecting project sites with low ecological sensitivity to reduce the risk of significant harm to marine habitats and species, while minimisation measures then aim to lessen the intensity and extent of remaining impacts by applying best practices in design, construction, operation, and decommissioning.

The OCEaN coalition published a [report](#) identifying avoidance and minimisation measures in the North and Baltic seas that have been tested in offshore contexts, implemented across multiple sites, and shown to effectively reduce negative environmental impacts. These measures have the potential to be applied to all projects to enhance environmental protection.

The report particularly states that the project and the construction phases are key to avoid and minimise impacts. In the project phase, the report outlines spatial planning as the most powerful tool to avoid negative impacts. The siting should be informed by Marine Spatial Plans and as a rule it is recommended to avoid (i) Natura 2000 and Marine Protected Areas, (ii) migration flyways, bird routes and areas frequently used by bats, (iii) marine mammal migratory, nursing and mating areas. Still in the project phase, but focusing on the design of turbines, avoidance of impacts may

¹ Including CAN Europe

be achieved by adjusting the height of the turbines to migratory flight patterns or by enhancing detectability of the blades through contrast colouring or UV-paints.

The decommissioning phase is also important as shown by another [recent report](#) published by Seas at Risk. The report stresses that decommissioning strategies should be tailored to local ecological conditions and based on robust monitoring, favouring flexible approaches (including partial removal or adaptive end-of-life options) that minimise disturbance to existing marine habitats and support long-term biodiversity outcomes.

2.1.2 Belgium: the 4Sea Coalition

Belgium plans to [scale up its offshore wind capacity](#) from 2.26 GW today to 5.8 GW by 2030, and 8 GW by 2040 - expecting to supply up to 25% of national electricity demand. avoid 8.6 MtCO₂ emissions annually. While vital to addressing the climate crisis, this expansion presents growing challenges for marine biodiversity, as offshore energy development increasingly overlaps with marine protected areas and migratory species pathways, such as those used by seabirds.

To address these risks, national environmental NGOs and offshore wind developers formed the 4Sea Coalition, bringing together Greenpeace Belgium, WWF-Belgium, Natuurpunt and Bond Beter Leefmilieu with the Belgian Offshore Platform. The partnership aims to build and promote a [science-based, nature-inclusive approach to offshore wind development](#), and a shared commitment to lifecycle environmental criteria, strict compliance with the Habitats Directive, and adaptive management. Crucially, the coalition has used offshore wind planning as leverage to secure broader conservation outcomes by creating a common nature-positive framework - such the decision to designate 10% of the Belgian North Sea as strict marine reserves and managing 30% as protected areas across all wind project phases. Nonetheless, serious challenges remain. A [WWF study from October 2024](#) indicates that Belgium has not yet allocated sufficient marine areas to meet its non-binding 2030 offshore wind pledges. This highlights the practical tension between energy expansion and spatial limits in the sea. Addressing this requires not only better planning but also demand-side measures, energy efficiency, and diversification into other renewable sources. Still, the collaboration between the 4Sea Coalition and the Belgian Offshore Platform offers a compelling model for achieving a just, nature-positive transition through shared vision, scientific rigour, and sustained dialogue.

2.1.3 Netherlands - Start/Stop Project

The Netherlands has committed, under its [2030 roadmap](#), to reaching 70 GW of offshore wind capacity by 2030. At the same time, major bird migratory corridors cross its maritime territory, particularly during nocturnal spring and autumn migrations, when collision risks with offshore wind turbines are highest. Recognising this challenge, extensive [research has been conducted](#) in the North Sea to better understand the impacts of offshore wind deployment on bird populations, which is an essential step in informing spatial planning and minimising harm to biodiversity.

As a practical action, the Netherlands has developed the [Start/Stop project](#), which applies adaptive management measures to reduce [bird collisions](#). The initiative uses bird migration forecasting models to temporarily curtail turbine operations during peak migration events. These measures are guided by the Ministry of Economic Affairs and Climate Policy, which set a threshold of 500 birds

per kilometre per hour to trigger curtailment, demonstrating how science-based governance can reconcile offshore wind expansion with biodiversity protection.

This project is a successful example of interdisciplinary action to address a biodiversity issue. It involves scientific knowledge, several government representatives from different ministries, the Dutch Transmission System Operator (TenneT) and wind farm owners. There is a structured [10-steps plan](#) to implement the bird curtailment during such periods involving all these stakeholders in the process, from the alert based on the prediction, passing through the decision-making stepwise route until the evaluation.

Data points out that bird curtailment measures need only be applied during 2.5% to 5.5% of the spring and autumn migration seasons. This limited curtailment results in less than a 1% loss in energy production, while cutting the risk of bird collisions by 50%. A clear example of how both climate and nature can win with proper policies.

2.1.4 Onshore wind: Greece – Tilos Island Hybrid Power Plant

[Tilos](#), a small Greek island in the South Aegean, has around 500 residents and relies heavily on tourism, which can increase this number by 1.200 people in the high season. This island was the chosen one for a European Research Project Horizon 2020 and Eunice Energy Group consortium to design, build and operate the [Hybrid Power System S4S Tilos](#).

This TILOS project delivered the first-ever battery-based, wind and PV Hybrid Power Station in Greece. [The system includes](#) 800 kW of medium scale wind turbine, 160 kW photovoltaic solar park, comprising 592 solar panels. This system is capable of guaranteeing energy self-sufficiency almost all year.

This [awarded](#) project is a great example of energy transition advancing hand in hand with nature. Besides the energy project itself, the entire island and its surrounding islets are a protected [Natura 2000 Reserve](#), with over 150 species of resident and migratory birds and more than 650 plant species. Several environmental-related projects have been carefully implemented, such as the EU-funded LIFE-Nature project specifically targeted the improvement of conservation status of bird species and the "[Just Go Zero Tilos](#)" programme focused on circular economy and waste management, including recycling and composting.

2.2 Solar

2.2.1 Agrivoltaics

The growth of large-scale photovoltaic (PV) power is crucial for combating climate change worldwide. However, a [challenge](#) is the significant amount of land these systems may require. On one hand there is an urgent need for a rapid transition in the energy sector, on the other hand, land is also key to agriculture, pasture, carbon sequestration, biodiversity conservation, and regulating water and other ecosystem services.

Solar is the energy source with the [fastest growing rate](#) in the EU and it was, for the first time ever in 2025, the [biggest power source](#). While this is good news to climate action, land-use conflicts have also intensified because of overlaps with croplands, raising concerns about the displacement of agricultural activities. [Agrivoltaics systems \(Agri-PV\)](#) appear as a solution to this issue. These systems integrate crop production and PV power generation, facilitating dual land use. Agri-PV is expected to harmonise energy production with agriculture, providing shade for crops and livestock, supporting water collection for irrigation, and creating additional revenue for farmers.

[Studies](#) have found that agri-PV systems can bring benefits to crops and actually increase fruits and berries production by up to 16% and limit yield reductions to under 20% for less shade-tolerant crops using vertical solar panels. However, the income from electricity generation more than compensates for any drop in crop revenues. Central European countries produce substantial amounts of these crops and could benefit from the development of agri-PV systems.

According to [Ember's analysis](#), Czechia, Hungary, Poland, and Slovakia have the potential to install up to 180 GW of agri-PV, almost tripling Central Europe's renewable electricity output. Just 9% of this energy would be enough to fully power the region's farming and food processing sectors. This approach could play a major role in helping these countries meet their updated 2030 solar targets outlined in their National Energy and Climate Plans.

Using croplands as a suitable ecosystem to deploy renewable energy would be a three-win situation: advance climate action by increasing renewable energy sources, bring benefits to farmers and food security for improving ecosystem services such as pollination, and minimise any land dispute with highly environmentally sensitive areas.

[Agrivoltaics](#) have the potential to bring different actors together and advance the energy transition in a just way should it have the support of a legislative framework - as is the case in France and Germany. Also, a thorough spatial planning protecting other land uses and engagement of societal actors at early stages of its deployment are essential to success.

In the Netherlands, [agrivoltaic in gaining attention](#) in a context marked by pressure on both land and biodiversity - with a highly dense population and agriculture dominant land use, and consequently with nature continuing to decline under the combined impacts of intensive farming practice. Agrivoltaic is increasingly framed as a pathway to reconcile renewable energy deployment with biodiversity protection, while creating benefit for farmers. Dutch NGOs, such as [Natuur&Milieu](#), promote agrivoltaics as a biodiversity-positive land-use model that can enable decreasing biodiversity loss on farmland while supporting the energy transition.

2.2.2 Community Solar and Large-scale solar farms in Portugal

Portugal is on a fast track towards the green transition. It overachieved the 2020 target of reaching a 31% share ([reached 34%](#)) and now sets in its NECP a [renewable energy contribution in the final gross consumption of 51% in 2030](#). This fast transition raises questions regarding the tradeoffs between renewable energy deployment and nature.

Although Portugal has [not yet established a dedicated legal tool](#) for designating Renewable Acceleration Areas (as introduced under RED III), it has made progress through [technical assessments](#) aimed at identifying low environmental sensitivity zones for potential acceleration

areas for onshore projects. This study maps ecosystems, interested areas and land use of the country. Therefore, it highlights ecologically sensitive zones such as protected areas, Natura 2000 sites, wetlands, and Special Protection Zones from consideration, meaning that science and policymakers are well informed about where and what kind of natural areas and natural resources are present in the country to plan the installation of the solar and wind parks. For further details on the implementation of RED III and spatial planning in Portugal, refer to NGO joint [Overview of Renewable Energy Spatial Planning and Designation of Acceleration Areas in Selected EU Member States](#) (October 2025).

The installed capacity for solar energy is rapidly growing in Portugal. Even though it is still behind other energy sources, such as hydroelectric, it grew its installed capacity [from around 1.000 MW in 2020 to 6.175 MW in 2025](#). Also its [electricity generation capacity is fast increasing](#), denoting a steep transition in the country.

This expansion is coming both in large-scale solar parks but also in interesting community-level projects. Small-scale projects have the just transition at core, focusing not only on the energy source but in the community wellbeing and nature respect. These projects aim at ensuring that the access to renewable energies is just, helps to cover energy needs in an affordable manner and also upskill people from local communities for green jobs.

For instance, the [Telheiras/Lumiar Renewable Energy Community](#) is a locally managed solar initiative, aimed at producing and sharing clean energy. Its first installation, a 13-panel system (7.15 kWp), now supplies electricity to the Lumiar Parish Council building and 16 local households (three vulnerable in energy poverty) and the initiative is expanding to install a second photovoltaic system involving 60 additional participants, including families, small businesses, and housing cooperatives. Overall, this is an example where a local project is reducing GHG emissions and positively impacting lives and livelihoods.

3. OPPORTUNITIES

3.1 Cross-cutting opportunity to overcome potential conflicts: implementation of strategic spatial planning under RED III

The rapid deployment of renewable energy can go hand in hand with biodiversity protection. With a strong policy and governance framework, the multiple case studies presented show that renewables can even actively contribute to nature protection and restoration. The sound implementation of EU legislations recently adopted, such as RED III and the Nature Restoration Law, provides a unique window of opportunity to systematically reduce conflict between renewable deployment, biodiversity protection and even public acceptance. This is notably possible with the deployment of robust spatial planning for renewables, and the designation of acceleration areas, as set in RED III. A European Commission published a [study](#) on the designation of priority areas to be assigned as RAAs. Amongst other elements to be taken into account where to deploy the renewable energy, the study encourages the integration of renewable energy deployment with nature restoration efforts.

To ensure the mapping stage is both effective and sustainable, it is essential to coordinate and integrate environmental, spatial, and land-use considerations throughout all planning and implementation phases as set in RED III. A fully integrated approach of spatial planning and mapping for renewables should:

1. Prioritise low-conflict areas and therefore avoid ecologically sensitive areas, by prioritising artificial, degraded and built-up areas such as rooftops, parking lots or industrial zones;
2. Ensure robust and meaningful Strategic Environmental Assessments (SEA) for RAAs;
3. Improve access, quality and integration of biodiversity and environmental data - notably from experts and civil society;
4. Adopting transparent and well-documented mapping methodologies for spatial planning and mapping.

Furthermore, a nature-positive approach of spatial planning for renewables must be synchronised with the implementation of National Restoration Plans as set in the Nature Restoration Law. All in all aligning the planning of restoration activities with renewable energy deployment, including the designation of RAAs, can lead to project designs that advance both goals while fostering potential synergies. Advancing steadily and at the same time the development of RAA plans and the national restoration plans, Member States can ascertain synergies and ensure policy coherence to tackle climate and biodiversity crises.

As win-win practices for instance, the combination of solar power generation with environmental stewardship and agro-ecological practices on brownfields, former mining sites, or degraded land to recover degraded soils. [Solar parks](#) may have the ability to benefit pollinators by creating an environmentally positive microclimate. Also, the land between and under them can be used to plant a diverse mix of flowers to attract and provide vital reproductive resources and nesting sites, which are critical for the life cycle of many bees and other insects. It can also connect to other natural

habitats via hedgerows, creating important wildlife corridors that support biodiversity across the wider landscape.

3.2 Opportunities associated with Offshore Wind Energy Production

The offshore wind energy is projected to increase [sixteen-fold](#) by 2050, reaching at least 300GW of energy production. This energy shift, while essential to phase out fossil fuels and drive energy transition, also poses challenges to marine ecosystems and socio-economic activities, such as aquaculture, fishing and job upskilling.

Not all of EU maritime space is currently suitable for the placement of offshore wind energy, due to the [depth capacity of installation](#), the coastal and shallow sea areas are in the center of the dispute for space, once the majority of the maritime [Natura 2000 network](#)² is also there.

It is proven that offshore wind farms can affect biodiversity throughout the entire lifecycle of wind turbines, notably through habitat loss, barrier effect, migratory route deviation and collision risks. That is why we need a fully integrated, holistic, evidence-based approach that treats climate change and biodiversity loss as inseparable to unlock new opportunities. To overcome negative impacts, science-based information is essential. Evidence is still limited across the full life-cycle of wind turbines, from pre-operation to decommissioning, and the cumulative impacts of wind farms remain an important knowledge gap.

Maritime spatial planning is vital to balance offshore wind expansion, marine protection, and other sea uses. It helps manage trade-offs with biodiversity and socio-economic activities. Achieving a sustainable energy transition at sea requires inclusive stakeholder participation, robust data collection, and interdisciplinary planning. In 2021, the European Commission issued [guidelines to apply an ecosystem-based approach](#) in this process.

The synergy can be positive to nature as well. As mentioned above, offshore wind farms can bring ecological benefits by creating artificial reef habitats that shelter marine life. By excluding bottom-trawling and integrating active restoration effort in line with the required by the Nature Restoration Law, these projects can foster biodiversity gains and support conservation targets while coexisting with renewable energy production.

Overall, the growth of offshore wind energy might [risk harming](#) marine ecosystems and undermining the vital services they provide to society. However, through [careful maritime planning](#), design, and operation that prioritise biodiversity - by considering tools such as the [Wildlife Sensitive Mapping](#), it is possible to minimise negative impacts and even generate ecological benefits. In doing so, offshore wind can play a dual role: tackling climate change while delivering gains for nature.

² Natura 2000 is the EU's network of protected areas, comprising Special Protection Areas (SPAs) designated under the Birds Directive for wild bird species and Special Areas of Conservation (SACs) under the Habitats Directive for habitats and other species.

3.3 Opportunities associated with Solar Energy Production

While often perceived as having fewer direct impacts than wind turbines, large-scale solar PV developments also present environmental risks. Animal collisions on power lines and PV panels, and the direct occupancy of land in large-scale solar PV parks driving land-use change and habitat degradation are the main challenges. However, well-planned solar energy projects can also generate meaningful environmental benefits when projects are planned and built properly.

Solar parks when combined with ecological management can create new habitats, shelter, feeding and nesting grounds for many species. Studies [in the UK](#) and [in Germany](#) have shown that solar farms with maintained grasslands (wildflower meadows) can support high pollinator abundance, including bees and butterflies, small mammals and ground-nesting birds, and even increase floral diversity compared to neighbouring agricultural land. There are opportunities also for [sheep grazing](#) under the panels. These examples demonstrate that, with nature-inclusive design and appropriate ecological management, solar developments can act as biodiversity refuges and avoid threats.

Alongside other [civil society organisations](#), CAN Europe advocates for maximising the use of degraded lands, such as former mines, industrial sites and brownfields to the deployment of solar parks. These sites are equipped with transmission lines, can bring economic benefits to the communities by upskilling workers and bring revenue, and will not compete with natural areas for land use.

4. CONCLUSIONS AND RECOMMENDATIONS

The ambition to decarbonise Europe must be matched by an equally strong commitment to biodiversity protection, ecosystem restoration, and a just energy transition for all, actively seeking synergies between these interconnected goals. Achieving a truly sustainable future requires a holistic approach that spans the entire lifecycle of renewable energy technologies, from responsible material sourcing and transparent governance to meaningful public participation, nature-inclusive design, and strategic spatial planning that enables rapid yet responsible deployment. Europe must demonstrate that climate action, nature conservation, and social justice are not competing objectives but are, in fact, mutually reinforcing pillars of a resilient and sustainable transition.

This briefing has highlighted exemplary case studies alongside key risks and opportunities that decisionmakers must navigate to steer the energy shift responsibly. Building on these insights, the following recommendations aim to ensure that Europe's energy transition advances in harmony with both nature and people:

1. **Policy coherence to grasp synergies:** Policy frameworks must move beyond siloed objectives and actively foster coherence between renewable energy deployment targets and critical environmental and land-use considerations. Both at EU-level with an alignment between RED targets and NRL objectives, but also at national-level, as seen in the Agrivoltaics case in many countries, the policy framework must be tailored to grasp synergies and have common goals. Furthermore, the Commission must keep supporting the Member States to transpose RED III into national, with strong implementation on spatial planning and mapping, while securing the highest environmental safeguard for renewable development at EU and national levels.
2. **Proactive and multi-stakeholder collaboration:** Exemplary models like the 4Sea coalition and Belgian Offshore Platform, where industry, environmental organisations, and government bodies collaboratively develop and implement solutions. Such partnerships can accelerate innovation, build trust, and streamline project development by integrating environmental and social considerations from the earliest stages, ensuring meaningful engagement with communities.
3. **Appropriate Environmental Assessments:** The implementation and rigorous enforcement of comprehensive Environmental Impact Assessments³ that cover the entire lifecycle of all projects involved in the energy shift. These ought to include cumulative impacts and long-term waste management, with full transparency and meaningful public participation.
4. **Protect and restore Natura 2000 sites, EU and National reserves and migratory routes:** Areas of ecological sensitivity must be precluded from being designated as RAAs. Although the Natura 2000 network is a legally binding obligation under the EU's Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC), it is still in development. The NRL outlines targets of restoration and these sensitive sites are ideal for restoration and preservation. RAAs and Strategic Projects must point out only locations where

³ Or Strategic Environmental Assessment (SEA) in the case of RAAs.

environmental impacts are deemed to be low and ecological regeneration must be included in project proposals from the very start.

5. **Science-based, nature-positive and community-benefiting approaches should be prioritised:** Scientific research is necessary to fill knowledge gaps that will guide the transition, particularly concerning cumulative impacts and the long-term effects of renewable energy infrastructure, and impacts of the decommissioning phase that is not well understood.
6. **Ensure integrated Spatial Planning for renewables in line with the highest environmental standards:** Develop and refine comprehensive land and marine spatial plans that strategically allocate space for renewable energy development while explicitly protecting and restoring sensitive ecosystems that must be signaled in the National Restoration Plans. There is an opportunity to simultaneously advance climate and biodiversity aspects of the just transition that policymakers in the EU- and national levels must seize.
7. **Make benefit-sharing, community engagement and nature-positive as standard for a fast and fair deployment of renewables:** Renewable energy projects must be developed in ways that simultaneously uphold strong environmental standards and systematically embed fair benefit-sharing mechanisms for local communities. Delivering a just transition requires that every project integrates nature-inclusive design, such as biodiversity gains, habitat protection, and multifunctional land use, to tangible economic and social benefits for those hosting the projects. For further details, see [CAN Europe's report "Community Engagement and Fair Benefit Sharing of Renewable Energy Projects"](#) (April 2025).
8. **Transparent and Inclusive Public Participation:** Genuine community engagement and local concerns are fundamental prerequisites for project feasibility and long-term success, as observed in the Tilos project. Ignoring it can lead to significant delays, large protests, financial losses, and public outcry, as seen in the Jadar case and in Portugal large-scale solar parks.

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